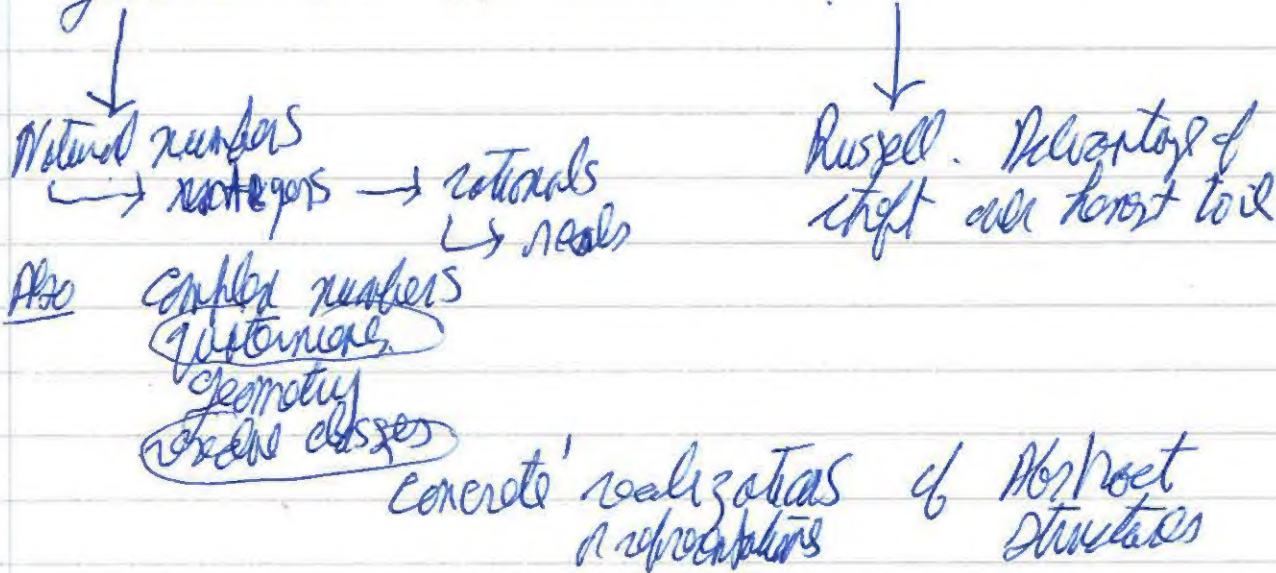


4. What distinguishes Planch. from Archimedes' method?

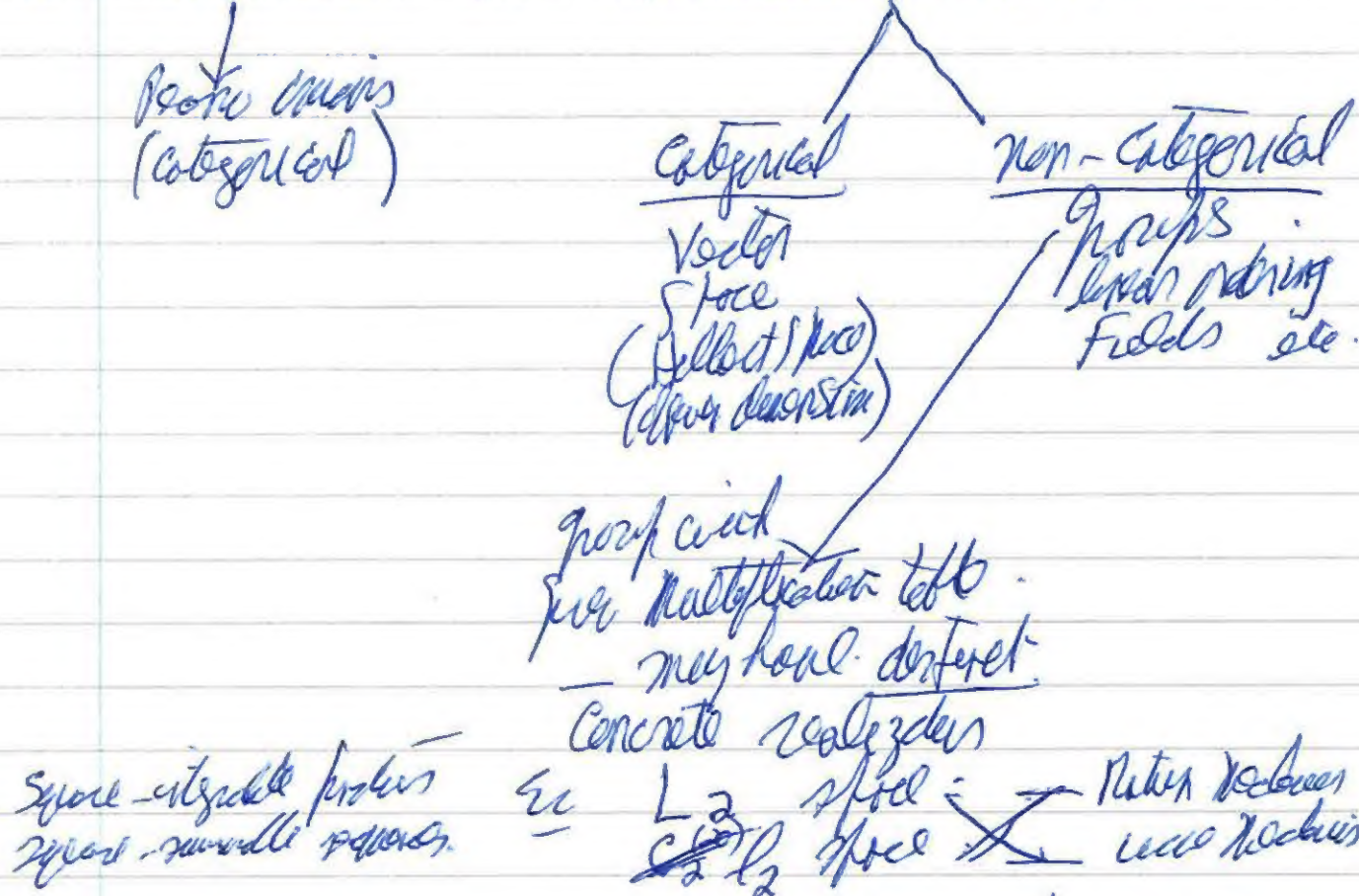
The Role of Mathematics in Physics

The Nature of Mathematics

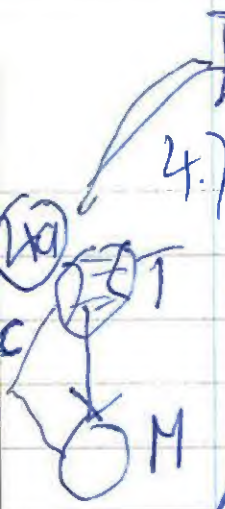
1. Genetiv. Axiomatic method.



2. Intentional w. Extensional semantics



3. Mathematical models are concrete realizations or categorical abstract structures



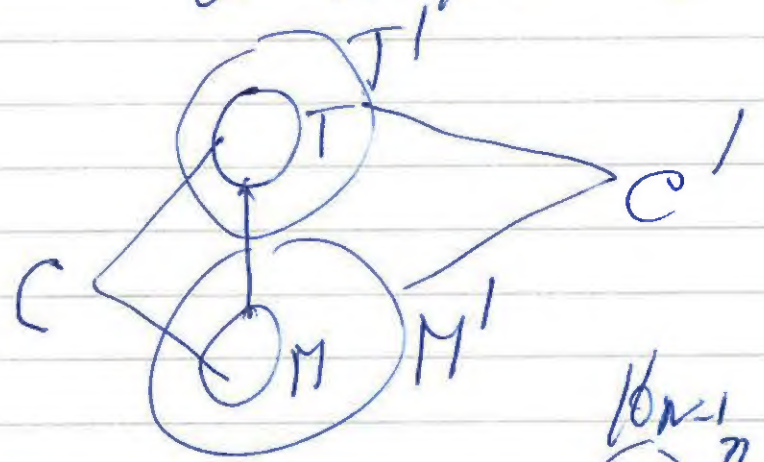
4.7 What distinguishes Mathematical structures from arbitrary organized structures.
 determined by defn, e.g., physical theory would be malconstructed

Ans set of all Concrete realizations in terms of Mathematical objects - controlled unlimited per numbers.

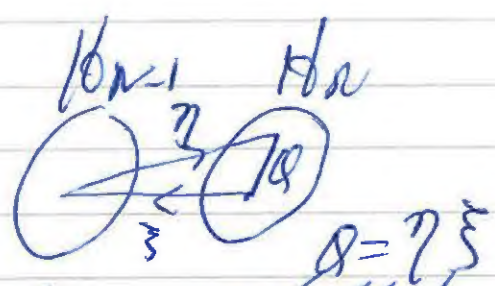
5. Use of non-categorical structures
 ex groups - economy of not repeating same argument in many different contexts.

6. Different ways of formulating a theory in terms of Surfaces Structures
 exs

Injection morphism



exs a) 2nd quantization



a) Analytic S-matrix, not nos involved in complex plane.

c) Rigorous group theory of deuterium

6a) Diagram for 2nd quantization example.

7. Heuristic Role of Surfaces Structures
 ex Q.E.D.
 How they & positions
 force theories of em.

8) Why is Mathematics successful?

cf. Hilbert's
Galileo

Does not quantify aspects of the world (what can be measured) of Galileo
Archimedes, geometry extracted from empirical experience of natural world,
does not explain more sophisticated examples.

Hilbert Space, QM
Noncommutative Geometry, G.R.

How - Problems amenable to mathematicians
first to be treated - classical
mechanics v. Nuclear Physics

9) \downarrow Computation gap - Empirical.
Mathematicians - often confused justified
in terms of successful predictions

10) The Role of the Computer - this
problem has not really gone away.

11) Progress in Mathematics: Distinction
from modern abstract approach.
e.g. Stokes, Poincaré

12) Students in theoretical Physics & too
much rigor - their 8th function
let below against shifts or
inherent reasoning.

13) The Nature of Idealization: -

cf. Galileo
non abstract
Addition of ideal elements - set
force of motion - cf. Hilbert v.
Cauchy on nature of formalist approach
to Mathematics - cf. earlier studies
discussed above.

14.) Modern Relativity: Since the age of
 age of Relativity — ^{not}
 of significant relativity in ^{not}
 relativity

15.) Interaction between physics &
 Mathematics

Kepler ellipses
 Hilbert Space - QM
 Heisenberg principle - QM

16.) ~~Conclusion~~ The use of mathematical
 physics to predict precise results
 like grand state of Helium
 level shift
 Anomalous shift of orbitals
 (10 significant figures)
 How is this possible??

Well, and then further math I
 think I will keep and
 look forward to common and
 discussion from the audience.

Quotations

Galileo : If ears, tongues and noses
were removed, shapes, numbers &
measures would remain — The Assayer

The book of Nature is written in
mathematical characters — The Assayer.

Russell The former (Axioms) has the
ontology of theft and honest toil